

capital region air quality management framework

2016 AMBIENT AIR QUALITY
ASSESSMENT SUMMARY REPORT

January 15, 2018



PURPOSE

Ambient air quality Assessment Summary Reports are produced annually under the *Capital Region Air Quality Management Framework*¹. The purpose of these reports is to assign an ambient air quality level to each monitoring station in the Capital Region for the Framework's four contaminants of concern (nitrogen dioxide, sulphur dioxide, fine particulate matter, and ozone).

See the Background to the Capital Region Assessment Summary Reports² for descriptions of the following four contaminants of concern: the air monitoring in the region and the triggers, limits, and levels for the contaminants. The [Implementation Progress Report](#)³ provides analysis of how the sources and other factors have influenced the ambient air quality levels and information about management actions chosen or assigned to stations in the Capital Region.

The 2014 Assessment Summary Report contains level assignments for :

- NO₂ and SO₂ based on the 2014 data.
- PM_{2.5} and O₃ based on the 2011-2013 data period.

The 2015 Assessment Summary Report contains level assignments for :

- NO₂ and SO₂ based on the 2015 data

The 2016 Assessment Summary Report **does not** contain new level assignments for PM_{2.5} or O₃ for the 2012-2014 or 2013-2015 data periods. The level assignments for this data period are part of Alberta's Air Zone reporting under the Canadian Ambient Air Quality Standards (CAAQS) and Canada's Air Quality Management System. The level assignments for this data period have not yet been released and therefore have not been included in the 2016 Assessment Summary Report.

The 2016 ambient air quality level assignments are outlined on the following pages. Air quality level assignments for each air quality parameter in the Capital Region Air Quality Management Framework correspond to specific management intents.


Historical trends for each air quality parameter consist of a graphical display of the following:

- Calculated metric concentrations from 2004 to 2016 for NO₂ and SO₂
- Assigned action/management levels from 2001-2003 to 2011-2013 for PM_{2.5} and O₃ (the assessment of PM_{2.5} and O₃ are based on three year averages).

1 Alberta Environment and Sustainable Resource Development. 2012. *Capital Region Air Quality Management Framework*. www.environment.gov.ab.ca/info/library/8593.pdf

2 Alberta Environment and Sustainable Resource Development. 2013. *Backgrounder – Ambient Air Quality Assessment Summary Reports*. <http://esrd.alberta.ca/focus/cumulative-effects/capital-region-industrial-heartland/documents/BackgrounderAmbientAirQualityAssessment.pdf>

3 Alberta Environment and Sustainable Resource Development. 2016. *Implementation Progress Report*. <https://open.alberta.ca/dataset/213769cf-1372-4637-9e50-b08951100642/resource/92ac979c-855b-4520-9fcf-f12b43b5a47c/download/2016-Capital-Region-Implementation-Progress-Report-2012-2015-July-2016.pdf>



Figures and textual summaries of the historical trends can be found in the Appendix of this report. Historical trends for upper range (NO₂ and SO₂), 98th percentile of 24 hour average action/management level (PM_{2.5}) and 4th highest daily 8-hour maximum action/management level (O₃) are intended to highlight the frequency and magnitude of peak (short-term elevated) concentrations. In this report historical trends are described based on the absolute change in concentrations or action/management level from the beginning to the end of the analyzed period. An increasing trend may signify that peak concentrations are increasing in magnitude or occurring more frequently. Likewise, a decreasing trend may signify that peak concentrations are decreasing in magnitude or occurring less frequently. Historical trends for the annual average (NO₂, SO₂, PM_{2.5}) are intended to highlight year-round large scale changes in observed concentrations.

NITROGEN DIOXIDE ANNUAL AVERAGE

Level Assignment

Gold Bar monitoring station did not meet data completeness criteria during the summer months of 2016 and was not assigned a level.

Ardrossan monitoring station commenced monitoring in July 2015 and nitrogen dioxide measurements met data completeness criteria for 2016. Therefore, 2016 was the first year that an ambient air quality level was assigned to Ardrossan for the annual average of nitrogen dioxide concentrations. Ardrossan was assigned to Level 1 for 2016.

St. Albert monitoring station commenced monitoring in April 2016. Therefore, St. Albert monitoring station did not meet data completeness requirements for 2016 and was not assigned a level for the annual average of nitrogen dioxide concentrations.

Gibbons monitoring station commenced monitoring in February 2016. Therefore, Gibbons monitoring station did not meet data completeness requirements for 2016 and was not assigned a level for the annual average of nitrogen dioxide concentrations.

All other monitoring stations remain assigned to the same levels as the 2015 *Assessment Summary Report*.

Table 1 lists the results of the nitrogen dioxide annual average assessment and ambient air quality level assignment.

Table 1: Nitrogen Dioxide Annual Average Ambient Air Quality Level Assignment

Year	Alberta Capital Airshed							Fort Air Partnership							West Central Airshed Society						
	Ardrossan	Edmonton Central	Edmonton East	Edmonton South	Gold Bar	Sherwood Park	St. Albert	Woodcroft	Bruderheim	Elk Island	Fort Saskatchewan	Gibbons	Lamont	Range Road 220	Redwater	Ross Creek	Scotford (Temporary)	Genesee	Meadows	Tomahawk	Wagner
	Assessment Level																				
2004		3	2							2		1	1	1	2				1		
2005		3	2							2		1	2	2	2			1	1	1	
2006		3	2	2						2		1	1	1	2			1	1	1	
2007		3	2	2					1	2		1	1	1	2			1	1	1	
2008		3	2	2					1	2		1	2	2	2			1	1	1	
2009		3	2	2	2	2			1	2		1	1	2	2			1	1	1	
2010		3	2	2	2	2			1	2		1	2	2	2			1	1	1	1
2011		2	2	2	2	2		3	1	1	2		1	1	1			1	1	1	1
2012		2	2	2	2	2		2	1	1	2		1	1	1			1	1	1	1
2013		3	2	2	2	2		2	1	1	2		1	1	2	2		1	1	1	1
2014		2	2	2	2	2		2	1	1	1		1	1	2	2		1	1	1	1
2015		2	2	2	2	2		2	1	1	2		1	2	2	1	1	1	1	1	1
2016	1	2	2	2		2		2	1	1	2		1	1	2	1	1	1	1	1	1

NITROGEN DIOXIDE UPPER RANGE OF THE HOURLY DATA

Level assignment

Range Road 220 monitoring station was assigned to Level 1 for 2016, a decrease from the Level 2 assignment the station received in the 2015 Assessment Summary Report.


Gold Bar monitoring station did not meet data completeness criteria during the summer months of 2016 and was not assigned a level.

Ardrossan monitoring station commenced monitoring in July 2015, and nitrogen dioxide measurements met data completeness criteria for 2016. Therefore, 2016 was the first year that an ambient air quality level was assigned to Ardrossan for the upper range of nitrogen dioxide concentrations. Ardrossan was assigned to Level 1 for 2016.

St. Albert monitoring station commenced monitoring in April 2016. Therefore, St. Albert monitoring station did not meet data completeness requirements for 2016 and was not assigned a level for the upper range of nitrogen dioxide concentrations.

Table 2: Nitrogen Dioxide Upper Range of the Hourly Data Ambient Air Quality Level Assignment

Year	Alberta Capital Airshed							Fort Air Partnership							West Central Airshed Society						
	Ardrossan	Edmonton Central	Edmonton East	Edmonton South	Gold Bar	Sherwood Park	St. Albert	Woodcroft	Bruderheim	Elk Island	Fort Saskatchewan	Gibbons	Lamont	Range Road 220	Redwater	Ross Creek	Scotford (Temporary)	Genesee	Meadows	Tomahawk	Wagner
2004		2	2							2		1	1	2	2					1	
2005		2	2							2		1	2	2	2		1	1	1		
2006		2	2	2						2		1	2	2	2		1	1	1		
2007		2	2	2					1	2		1	2	2	2		1	1	1		
2008		2	2	2					1	2		1	3	2	2		1	1	1		
2009		2	2	2	2	2			1	2		1	2	2	2		1	1	1		
2010		2	2	2	2	2			1	2		1	2	2	2		1	1	1	1	
2011		2	2	2	2	2	2	1	1	2		1	2	2	2		1	2	1	1	
2012		2	2	2	2	2	2	1	1	2		1	1	1	2		1	1	1	1	
2013		2	2	2	2	2	2	2	1	2		1	2	2	2		1	2	1	1	
2014		2	2	2	2	2	2	1	1	2		1	2	2	2		1	1	1	1	
2015		2	2	2	2	2	2	1	1	2		1	2	2	2	1	1	1	1	1	
2016	1	2	2	2		2	2	1	1	2		1	1	2	2	1	1	1	1	1	



Gibbons monitoring station commenced monitoring in February 2016. Therefore, Gibbons monitoring station did not meet data completeness requirements for 2016 and was not assigned a level for the upper range of nitrogen dioxide concentrations.

All other monitoring stations remain assigned to the same levels as the *2015 Assessment Summary Report*.

Table 2 lists the results of the nitrogen dioxide upper range of the hourly data assessment and ambient air quality level assignment.

SULPHUR DIOXIDE ANNUAL AVERAGE

Level Assignment

For the 2016 assessment summary, Redwater monitoring station was assigned to Level 3, an increase from the Level 2 assignment the station received in the *2015 Assessment Summary Report*. Redwater monitoring station is located within the boundaries of an industrial property in close proximity to point sources associated with production equipment. Due to its location, Redwater monitoring station is not representative of regional air quality. The Fort Air Partnership conducted a station siting suitability assessment in 2016 to optimize the location of the station for the collection of representative regional air quality data. The station commenced operation in October 2017, at a new site within the town of Redwater.

Scotford monitoring station was moved from its location in May 2014 due to pipeline right-of-way expansion at the location of the site. Scotford (Temporary) monitoring station was established in May 2014, 5 km southeast of the Scotford monitoring station site. Scotford (Temporary) monitoring station will remain indefinitely until a location for a permanent monitoring station can be located. The Fort Air Partnership is actively working with stakeholders to identify and establish a suitable permanent site in the near future.

Elmjay monitoring station was decommissioned in Spring 2015 and Ardrossan managing station was opened in the Summer 2015 as part of the changes the Strathcona Industrial Association undertook to their air monitoring network. Ardrossan monitoring station commenced monitoring in July 2015 and sulphur dioxide measurements met data completeness criteria for 2016. Ardrossan was assigned to Level 1 for 2016.

Gibbons monitoring station commenced monitoring in February 2016. Therefore, Gibbons monitoring station did not meet data completeness requirements for 2016 and was not assigned a level for the annual average of Sulphur dioxide concentrations.

All other stations remain assigned to Level 1.

Table 3 lists the results of the sulphur dioxide annual assessment and ambient air quality level assignment.

Table 3: Sulphur Dioxide Annual Average Ambient Air Quality Level Assignment

Year	Alberta Capital Airshed							Fort Air Partnership							West Central Airshed Society							
	Ardrossan	Beverly	Edmonton East	Edmonton South	Elmjay	Gold Bar	Sherwood Park	Woodcroft	Bruderheim	Elk Island	Fort Saskatchewan	Gibbons	Lamont	Range Road 220	Redwater	Ross Creek	Scotford	Scotford (Temporary)	Genesee	Meadows	Tomahawk	Wagner
2004			1							1		1	1	2	1						1	
2005			1							1		1	1	2	1			1	1	1		
2006			1							1		1	1	1	1			1	1	1		
2007			1						1	1		1	1	2	1	1		1	1	1		
2008			1	1					1	1		1	1	2	1	1		1	1	1		
2009		1	1	1	1	1	1		1	1		1	1	2	1	1		1	1	1		
2010		1	1	1	1	1	1		1	1		1	1	3	1	1		1	1	1	1	1
2011		1	1	1	1	1	1	1	1	1		1	1	2	1	1		1	1	1	1	1
2012		1	1	1	1	1	1	1	1	1		1	1	2	1	1		1	1	1	1	1
2013		1	1	1	1	1	1	1	1	1		1	1	2	1	1		1	1	1	1	1
2014		1	1	1	1	1	1	1	1	1		1	1	2	1			1	1	1	1	1
2015		1	1	1		1	1	1	1	1		1	1	2	1		1	1	1	1	1	1
2016	1	1	1	1		1	1	1	1	1		1	1	3	1		1	1	1	1	1	1

SULPHUR DIOXIDE UPPER RANGE OF THE HOURLY DATA

Level Assignment

For the 2016 assessment summary, the Redwater monitoring station remains assigned to Level 4 and the Sherwood Park monitoring station remains assigned to Level 2. Redwater monitoring station is located within the boundaries of an industrial property in close proximity to point sources associated with production equipment. Due to its location, Redwater monitoring station is not representative of regional air quality. The Fort Air Partnership conducted a station siting suitability assessment in 2016 to optimize the location of the station for the collection of representative regional air quality data. The station commenced operation in October 2017, at a new site within the town of Redwater. Sherwood Park station is located in close proximity downwind of several major industrial facilities with large point source emissions of sulphur dioxide. The assignment of the Redwater and Sherwood Park monitoring stations to levels higher than other stations in the Capital Region indicates that these stations are more affected by peak concentrations than other stations in the Capital Region.

Scotford monitoring station was moved from its location in May 2014 due to pipeline right-of-way expansion at the location of the site. Scotford (Temporary) monitoring station was established in May 2014, 5 km southeast of the Scotford monitoring station site. Scotford (Temporary) monitoring station will remain indefinitely until a location for a permanent monitoring station can be located. The Fort Air Partnership is actively working with stakeholders to identify and establish a suitable permanent site in the near future.

Gibbons monitoring station commenced monitoring in February 2016. Therefore, Gibbons monitoring station did not meet data completeness requirements for 2016 and was not assigned a level for the upper range of Sulphur dioxide concentrations.

All other monitoring stations remain assigned to the same levels as the 2015 *Assessment Summary Report*.

Table 4 lists the results of the sulphur dioxide upper range of the hourly data assessment and ambient air quality level assignment.

**Table 4: Sulphur Dioxide Upper Range of the Hourly Data
Ambient Air Quality Level Assignment**

Year	Alberta Capital Airshed							Fort Air Partnership							West Central Airshed Society							
	Ardrossan	Beverly	Edmonton East	Edmonton South	Elmjay	Gold Bar	Sherwood Park	Woodcroft	Bruderheim	Elk Island	Fort Saskatchewan	Gibbons	Lamont	Range Road 220	Redwater	Ross Creek	Scotford	Scotford (Temporary)	Genesee	Meadows	Tomahawk	Wagner
2004			1							1		1	1	4	1						1	
2005			1							1		1	1	4	1				1	1	1	
2006			1							1		1	1	4	1				2	2	1	
2007			1						1	1		1	1	4	1	1			1	1	1	
2008			1	1					1	1		1	1	4	1	1			1	1	1	
2009		2	1	1	1	1	2			1	1		1	4	1	1			1	1	1	
2010		1	1	1	1	1	2			1	1		1	4	1	1			1	1	1	1
2011		1	1	1	1	1	2	1	1	1	1		1	4	1	2			1	1	1	1
2012		1	1	1	1	1	2	1	1		1		1	4	1	1			1	1	1	1
2013		1	1	1	1	1	2	1	1	1	1		1	4	1	1			1	1	1	1
2014		1	1	1	1	1	2	1	1	1	1		1	4	1				1	1	1	1
2015		2	1	1		1	2	1	1	1	1		1	4	1		1		1	1	1	2
2016	1	2	1	1		1	2	1	1	1	1		1	4	1		1		1	1	1	2

FINE PARTICULATE MATTER

Note that in 2016, the fine particulate matter analyzers at all monitoring stations in the Capital Region, with the exception of the Genesee and Redwater monitoring stations, were designated as Federal Equivalent Method (FEM) compliant. The FEM type analyzers more effectively account for the volatile components in measurements of fine particulate matter. This results in higher, but likely more representative measurements of fine particulate matter concentrations.

FINE PARTICULATE MATTER 24-HOUR METRIC, FINE PARTICULATE MATTER ANNUAL AVERAGE METRIC AND OZONE METRIC

Level Assignment

Reporting of the CAAQS for the period of 2012-2014 has not been released at the time of the publication of this report. Calculation of ambient metrics and determination of action level are similar for the CAAQS and the Capital Region Air Quality Management Framework. Please refer to the *2015 Ambient Air Quality Assessment Summary Report*⁴ for information relating to assessed management levels in past years. Assessed management levels for the most recently available period of 2011-2013, are those assigned using the CAAQS and documented in the *Alberta: Air Zones Report 2011-2013*⁵.

4 Alberta Environment and Parks. 2016. Capital Region Air Quality management Framework: 2014 Ambient Air Quality Summary Report. <http://aep.alberta.ca/lands-forests/cumulative-effects/regional-planning/capital-region/documents/CapitalRegion2014AirQualityReport-Jul2016.pdf>

5 Alberta Environment and Parks. 2015. Alberta: Air Zones Report 2011-2013. <http://aep.alberta.ca/air/management-frameworks/canadian-ambient-air-quality-standards-for-particulate-matter-and-ozone/documents/AlbertaAirZonesReport-2011-13-Sep2015.pdf>

APPENDIX

Nitrogen Dioxide Annual Average

Trends

Observations from urban monitoring stations (Edmonton Central, Edmonton East, Edmonton South, Fort Saskatchewan) have shown some year-by-year variation, but an overall reduction in nitrogen dioxide concentrations since 2004 (Figures 1 & 2). All other stations have shown variable year-over-year concentration changes between 2004 and 2016 (Figures 1, 2, & 3). Sherwood Park, Gold Bar, Bruderheim, Woodcroft, Ross Creek, Genesee, Meadows and Wagner monitoring stations have all observed reductions in nitrogen dioxide concentrations (Figures 1, 2, & 3). Lamont and Redwater monitoring stations have observed modest increases in nitrogen dioxide concentrations (Figure 2). Elk Island, Range Road 220, and Tomahawk monitoring stations observed no overall change in observed concentrations between 2004 and 2016 (Figures 2 & 3). Ardrossan was assessed for the first time and Scotford (Temporary) has observed a modest reduction since 2015 (Figures 1 & 2).

Figure 1:
Annual average concentrations of Nitrogen Dioxide at monitoring stations within the boundary of the Alberta Capital Airshed.

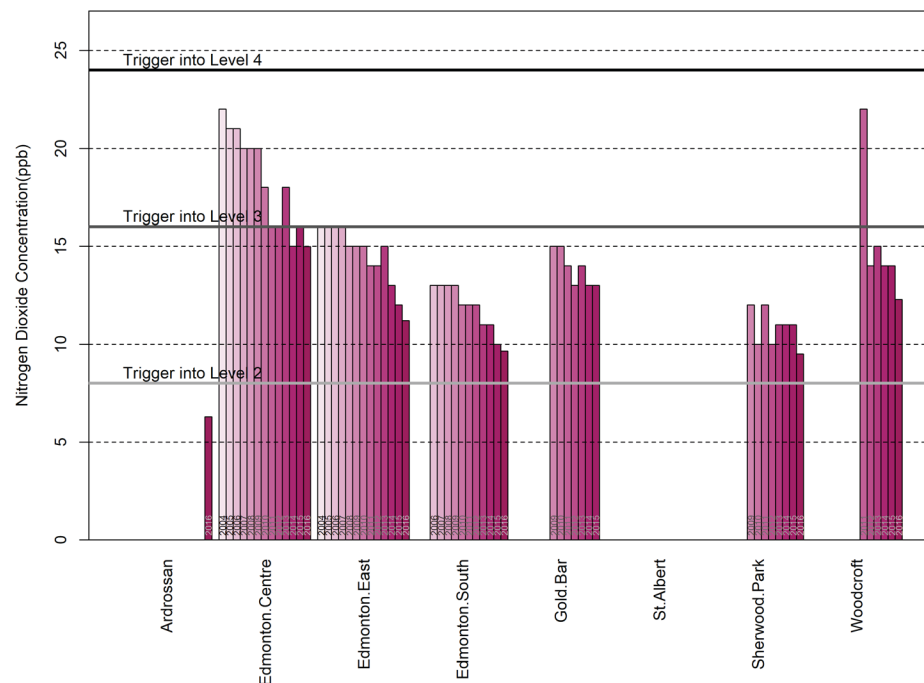


Figure 2:
Annual average concentrations of Nitrogen Dioxide at monitoring stations operated by Fort Air Partnership.

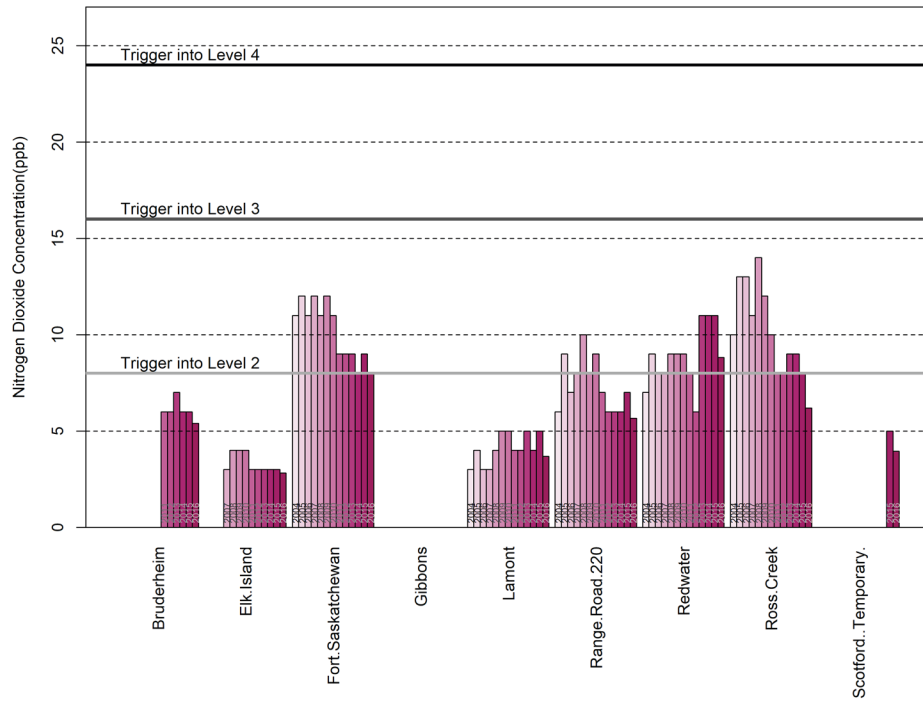
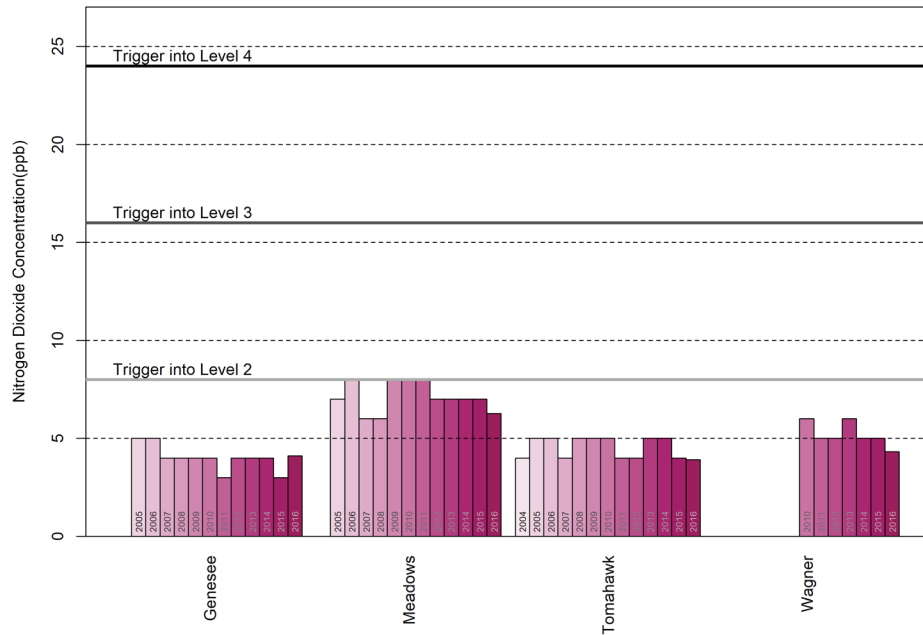


Figure 3:
Annual average concentrations of Nitrogen Dioxide at monitoring stations operated by West Central Airshed Society.



Nitrogen Dioxide Upper Range of the Hourly Data

Trends

Observations from urban monitoring stations (Edmonton Central, Edmonton East, Edmonton South, Fort Saskatchewan) have shown overall reductions in nitrogen dioxide concentrations since 2004 (Figures 4 & 5). However, these reductions have not been to the same degree as those observed for annual average concentrations, in addition to more variability being observed from year to year. All other stations have shown variable year-over-year concentrations changes between 2004 and 2016 (Figures 4, 5, & 6). Sherwood Park, Woodcroft, Elk Island, Ross Creek, Tomahawk, Meadows and Wagner monitoring stations have all observed overall modest reductions in nitrogen dioxide concentrations (Figures 4, 5, & 6). Range Road 220 monitoring station has observed a modest increase in nitrogen dioxide concentrations (Figure 5). Bruderheim, Gold Bar, Redwater, Lamont, and Genesee monitoring stations observed no significant change in observed concentrations between 2004 and 2016 (Figures 4, 5 & 6). Ardrossan was assessed for the first time and Scotford Temporary observed a modest reduction since 2015 (Figures 1 & 2).

Figure 4:
Upper range concentrations of Nitrogen Dioxide at monitoring stations within the boundary of the Alberta Capital Airshed.

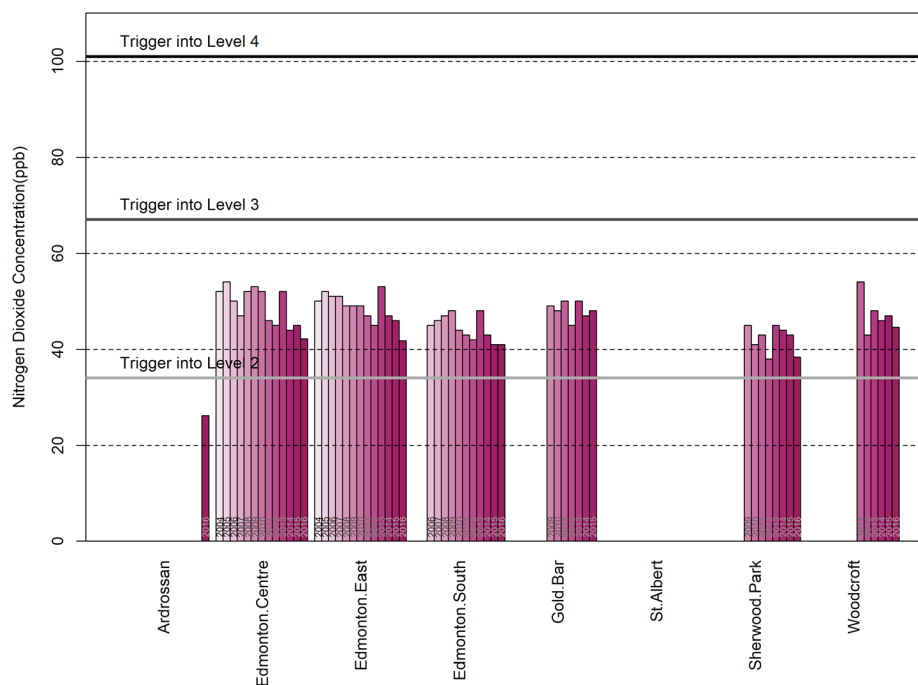


Figure 5:
Upper range concentrations of Nitrogen Dioxide at monitoring stations operated by Fort Air Partnership.

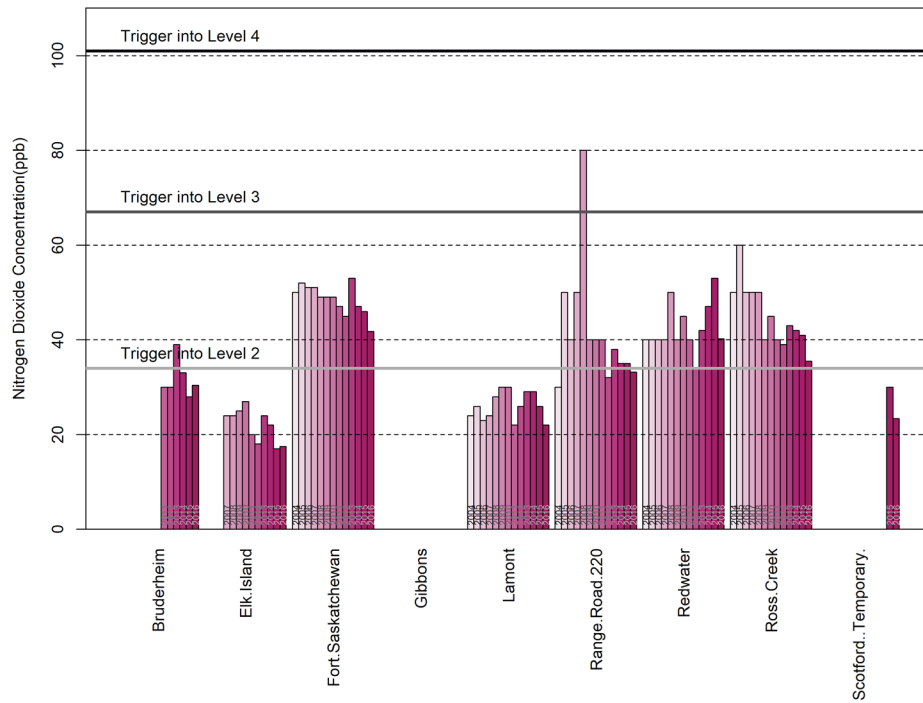
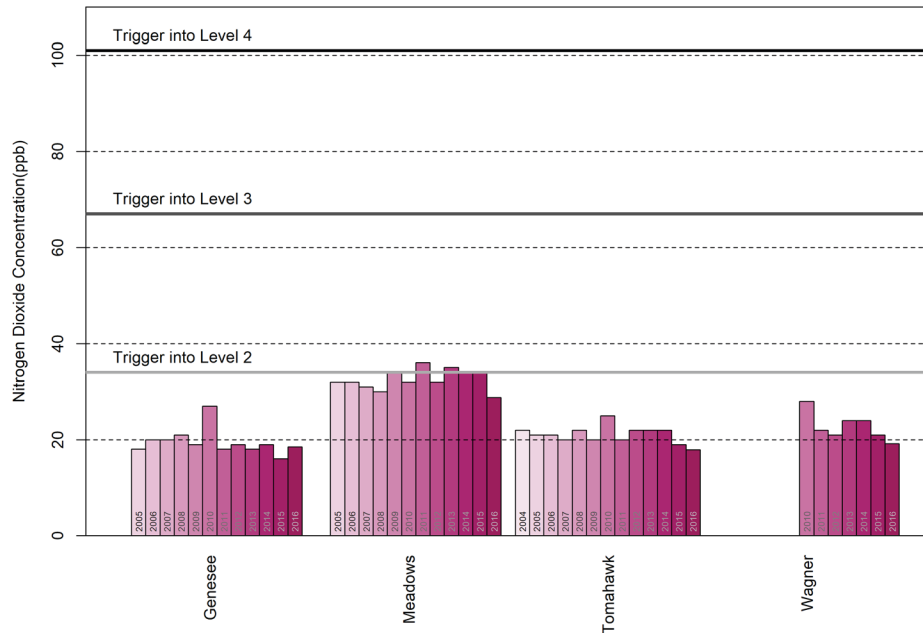


Figure 6:
Upper range concentrations of Nitrogen Dioxide at monitoring stations operated by West Central Airshed Society.



Sulphur Dioxide Annual Average

Trends

Beverly and Sherwood Park stations observed a decline in overall average sulphur dioxide concentrations between 2004 and 2016 (Figure 7). Redwater station observed an increase in sulphur dioxide concentrations between 2004 and 2016 (Figure 8). Other monitoring stations observed no overall change, outside of year-over-year variation, in observed annual average concentrations between 2004 and 2016 (Figures 7, 8, & 9). Ardrossan was assessed for the first time (Figure 7).

Figure 7:
Annual average concentrations of Sulphur Dioxide at monitoring stations within the boundary of the Alberta Capital Airshed. Years with a date and no visible bar recorded an annual average of 0 ppb for that year.

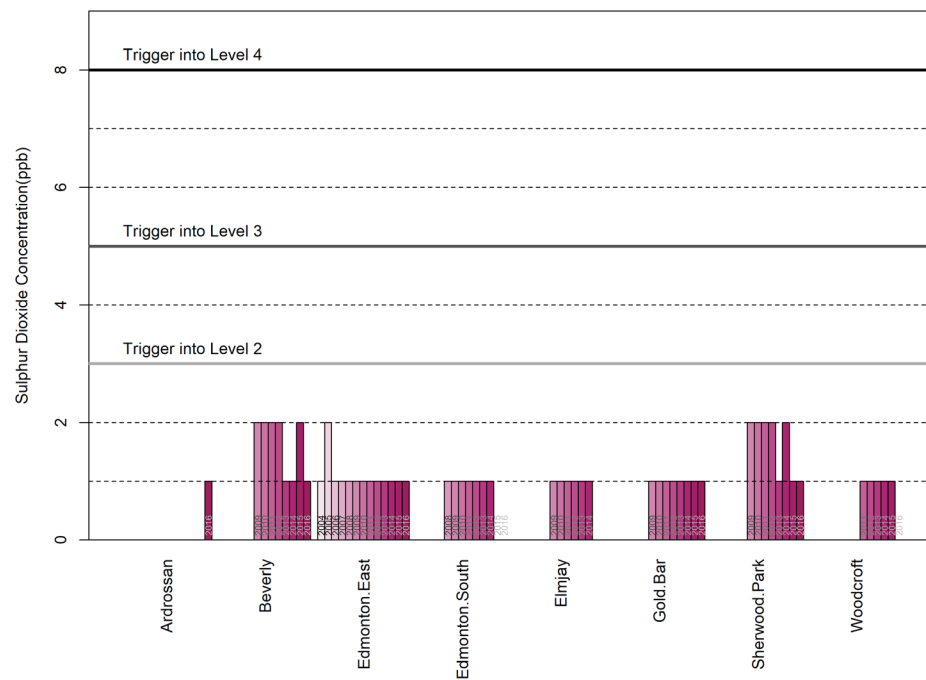


Figure 8:
Annual average concentrations of Sulphur Dioxide at monitoring stations operated by Fort Air Partnership. Years with a date and no visible bar recorded an annual average of 0 ppb for that year.

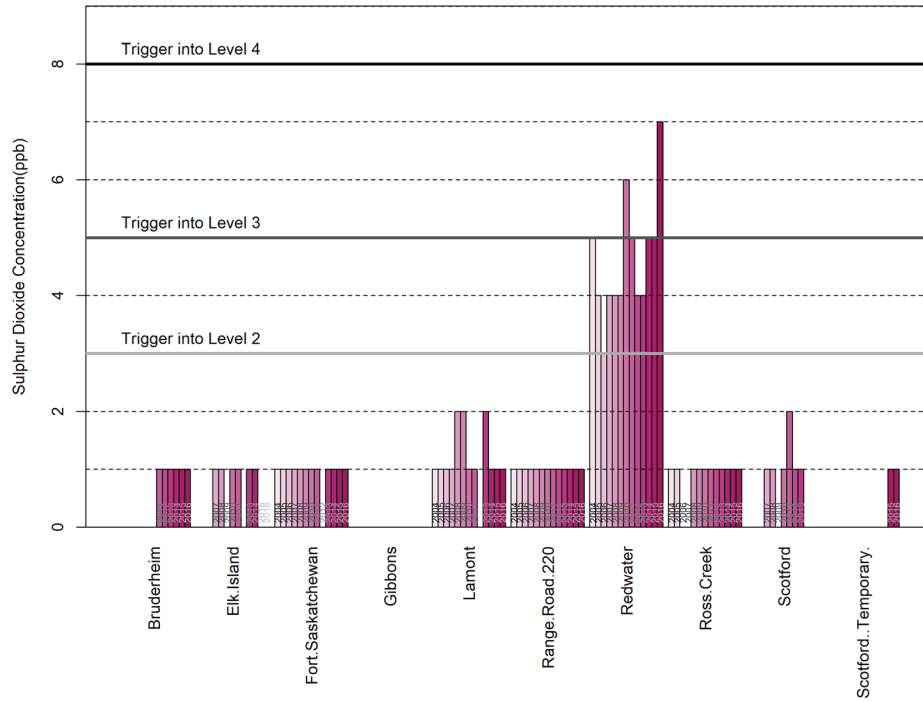
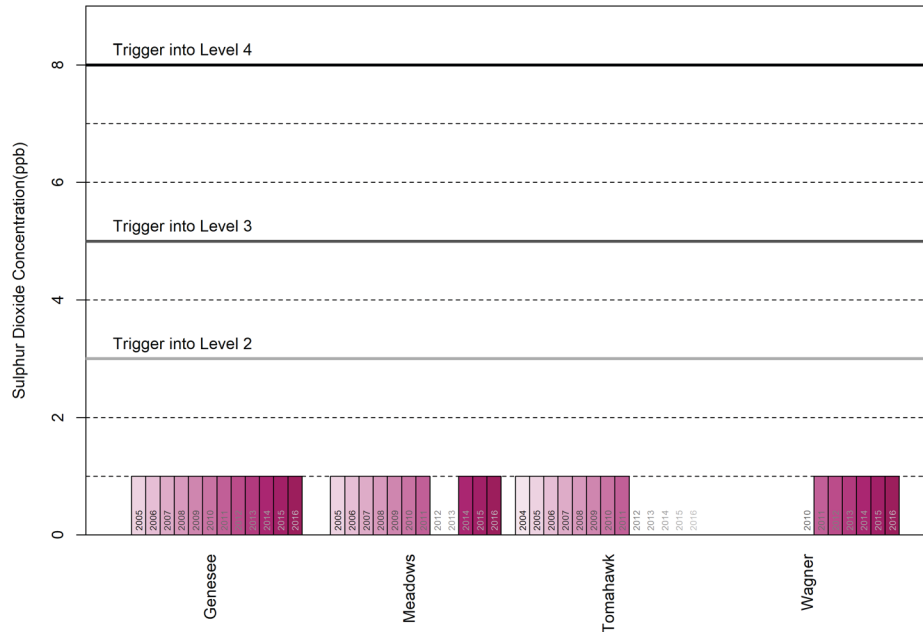


Figure 9:
Annual average concentrations of Sulphur Dioxide at monitoring stations operated by West Central Airshed Society. Years with a date and no visible bar recorded an annual average of 0 ppb for that year.



Sulphur Dioxide Upper Range of the Hourly Data

Trends

Monitoring stations near industrial facilities (Edmonton East, Sherwood Park, Elmjay, Gold Bar, Beverly, Lamont, Range Road 220, Redwater, Ross Creek, Genesee, Meadows, and Wagner) have shown variable year-over-year upper range concentrations changes between 2004 and 2016 (Figures 10, 11, & 12). Of these monitoring stations, Edmonton East and Wagner have observed modest increases, and Sherwood Park, Range Road 220, Gold Bar, Beverly, Lamont, Ross Creek, and Genesee observed an overall decrease in concentration between 2004 and 2016. Elmjay and Meadows did not observe any overall changes.

Monitoring stations away from industrial facilities (Edmonton South, Woodcroft, Elk Island, Fort Saskatchewan, Bruderheim, and Tomahawk), with the exception of Elk Island (which increased slightly), observed small decreases outside of year-to-year variability in observed upper range sulphur dioxide concentration between 2004 and 2016.

Ardrossan was assessed for the first time (Figure 10).

Figure 10:
Upper range concentrations of Sulphur Dioxide at monitoring stations
within the boundary of the Alberta Capital Airshed.

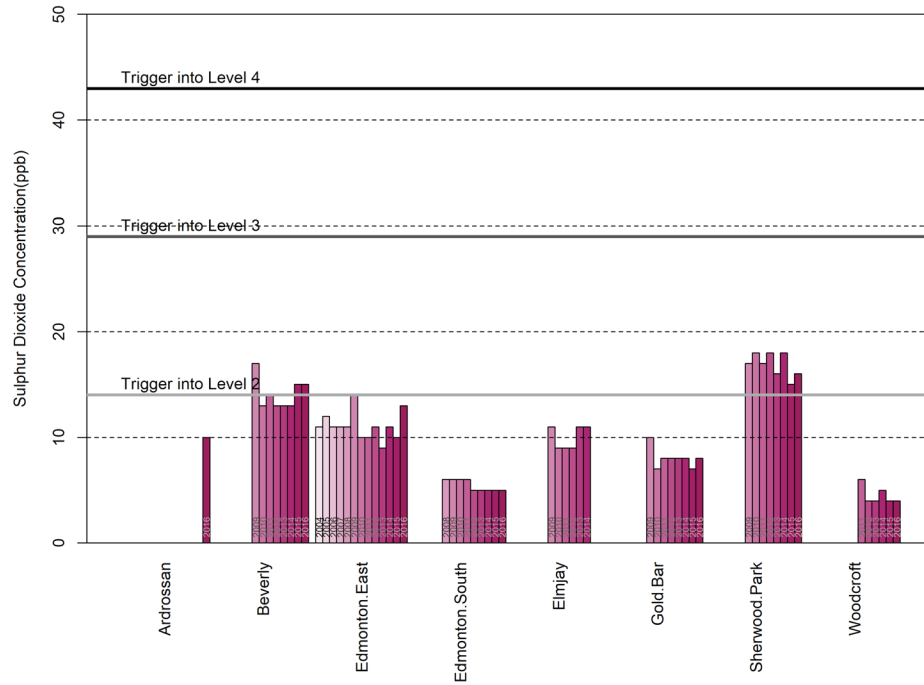


Figure 11:
Upper range concentrations of Sulphur Dioxide at monitoring stations
operated by Fort Air Partnership.

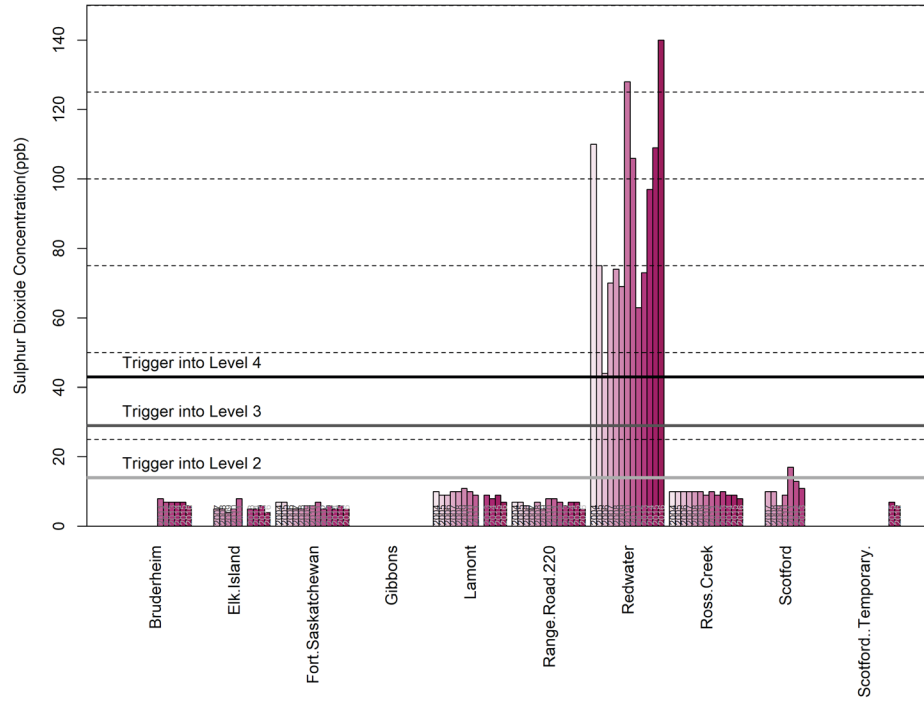
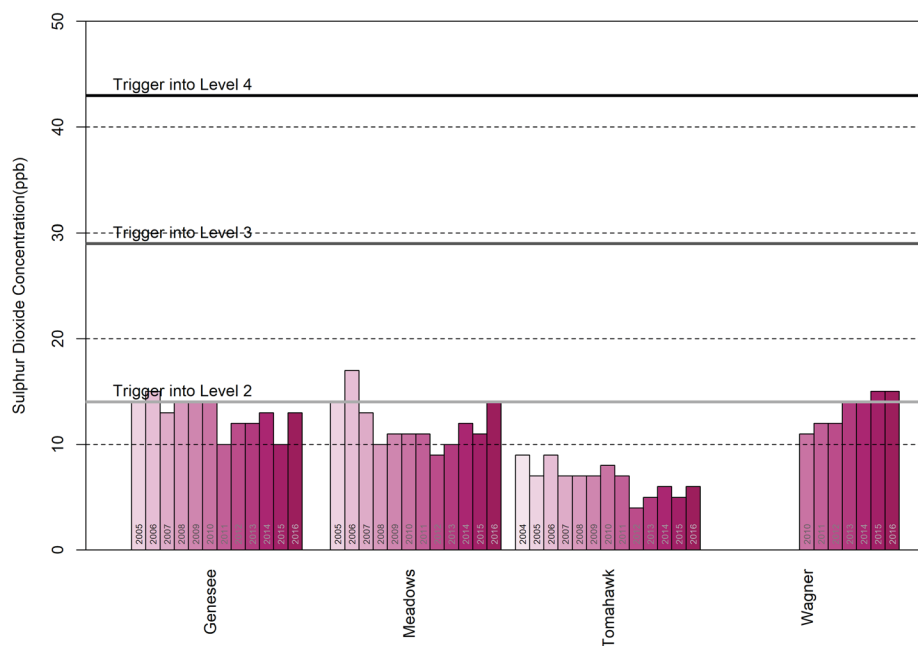


Figure 12:
Upper range concentrations of Sulphur Dioxide at monitoring stations operated by West Central Airshed Society.



Fine Particulate Matter 24-hour Metric

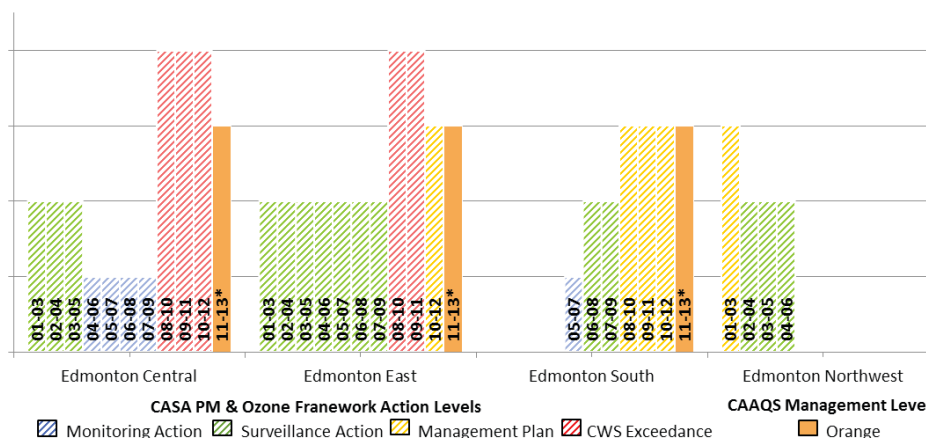
Trends

Reported concentrations of fine particulate matter against the CAAQS include all measured data to determine the 98th percentile or annual average concentration. In cases where a CAAQS metric exceeds the standard, trans-boundary flows and exceptional events (e.g. forest fire smoke events) may be considered for removal before re-calculation of the 98th percentile or annual average concentration and verification of achievement of the metric. Concentrations reported in the *Alberta: Air Zones Report 2011-2013* do not account for removal of trans-boundary flows and exceptional events, but the management level assignments do. The action/management levels reported in Figures 13, 14, and 15 take into account any trans-boundary flows and exceptional events.

Adoption of FEM type analyzers has resulted in a step change in observed fine particulate matter concentrations at Edmonton Central, Edmonton East, Edmonton South, Fort Saskatchewan and Lamont County monitoring stations between 2001-2003 and 2011-2013. This has resulted in an equivalent increase in assigned action/management level over this period. As outlined in the *Capital Region Fine*

*Particulate Matter Science Report*⁶ volatile species of fine particulate matter are in abundance in urban areas. The observed increase in assigned action/management level at urban locations is therefore consistent with the adoption of FEM analyzers at these locations. In general there is substantial variability in the 24-hour metric concentrations from year to year, potentially a result of the meteorologically dependent and episodic nature of secondary fine particulate matter formation in the Capital Region.

Figure 13:
24-hour metric of fine particulate matter (3 year average of annual 98th percentile concentrations) action/management level assignments at monitoring stations in the Alberta Capital Airshed. Columns with diagonal striping are action levels assigned under the former Clean Air Strategic Alliance (CASA) Particulate Matter and Ozone Management Framework, adopted by the Capital Region Air Quality Management Framework. Solid columns are management levels from the Alberta: Air Zones Report 2011-2013 assigned using the CAAQS. Action levels determined under the CASA Particulate Matter and Ozone Framework and management levels determined under the CAAQS may not be directly comparable due to differences in the removal of transboundary flows and exceptional events.



6 Alberta Environment and parks. 2014. Capital Region Fine Particulate Matter Science Report. <http://aep.alberta.ca/focus/cumulative-effects/capital-region-industrial-heartland/documents/CapitalRegion-PM-ScienceReport-Dec2014.pdf>

Figure 14:
24-hour metric of fine particulate matter (3 year average of annual 98th percentile concentrations) action/management level assignments at monitoring stations in the Fort Air Partnership airshed. Columns with diagonal striping are action levels assigned under the former Clean Air Strategic Alliance (CASA) Particulate Matter and Ozone Management Framework, adopted by the Capital Region Air Quality Management Framework. Solid columns are management levels from the Alberta: Air Zones Report 2011-2013 assigned using the CAAQS. Action levels determined under the CASA Particulate Matter and Ozone Framework and management levels determined under the CAAQS may not be directly comparable due to differences in the removal of transboundary flows and exceptional events.

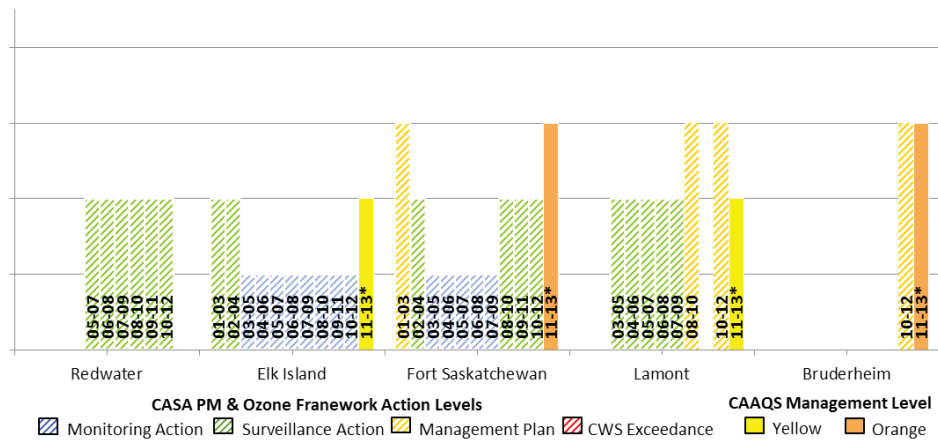
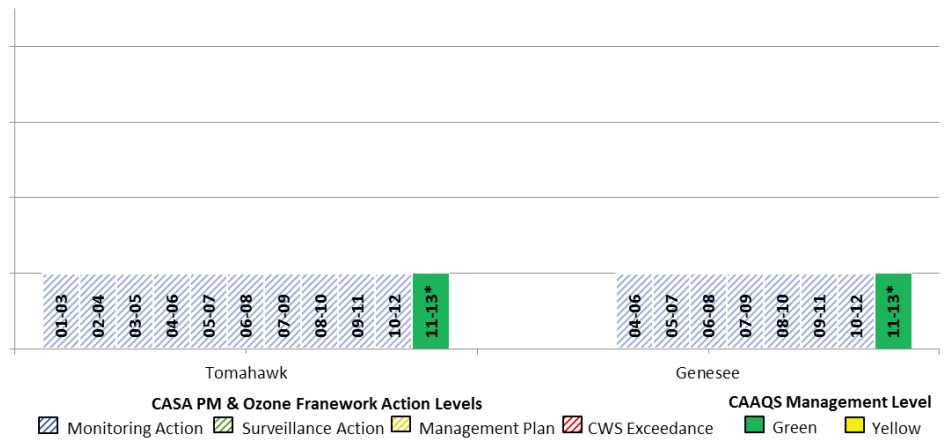


Figure 15:
24-hour metric of fine particulate matter (3 year average of annual 98th percentile concentrations) action/management level assignments at monitoring stations in the West Central Airshed Society airshed. Columns with diagonal striping are action levels assigned under the former Clean Air Strategic Alliance (CASA) Particulate Matter and Ozone Management Framework, adopted by the Capital Region Air Quality Management Framework. Solid columns are management levels from the Alberta: Air Zones Report 2011-2013 assigned using the CAAQS. Action levels determined under the CASA Particulate Matter and Ozone Framework and management levels determined under the CAAQS may not be directly comparable due to differences in the removal of transboundary flows and exceptional events.

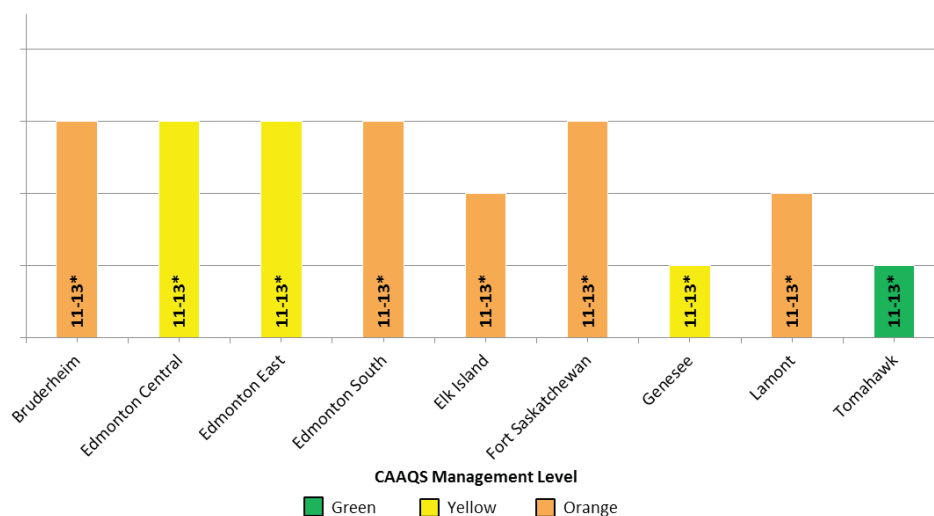


Fine Particulate Matter Annual Average Metric

Trends

The *Alberta: Air Zones Report 2011-2013* represents the first reporting of the annual average metric in the Capital Region. The assessed management levels are documented in Figure 16. Spatially, urban monitoring stations observe the highest concentrations of fine particulate matter.

Figure 16:
Annual average metric of fine particulate matter (3 year average of annual average concentrations) management level assignments at monitoring stations in the Capital Region. All management levels were determined after the removal of trans-boundary flows and exceptional events.



Ozone

Trends

Reporting of ozone concentrations against the CAAQS includes all observed data as included in the *Alberta: Air Zones Report 2011-2013*. In cases where a CAAQS metric exceeds the standard or threshold, trans-boundary flows and exceptional events (e.g. stratospheric intrusion of ozone) may be considered for removal before re-calculation of the 3-year-average of the annual 4th highest of the daily maximum 8-hour average concentration metric for verification of achievement of the metric. Concentrations reported in the *Alberta: Air Zones Report 2011-2013* do not account for removal of trans-boundary flows and exceptional events; however, the action/management level assignments do take into account trans-boundary flows and exceptional events.

Ozone action/management levels at all monitoring stations in the Capital Region have observed some variation. Many stations observed a rise in ozone action/management level assignment between 2006-2008 and 2009-2011. However, in general, ozone management levels have stabilized currently at or near their lowest historical assignment.

Figure 17:
8-hour metric of ozone (3-year-average of the annual 4th highest of the daily maximum 8-hour average concentrations) action/management level assignments at monitoring stations in the Alberta Capital Airshed. All action/management level assignments were determined after the removal of trans-boundary flows and exceptional events. Action/management level assignments determined under the CASA Particulate Matter and Ozone Framework and the CAAQS may not be directly comparable due to differences in the removal of transboundary flows and exceptional events.

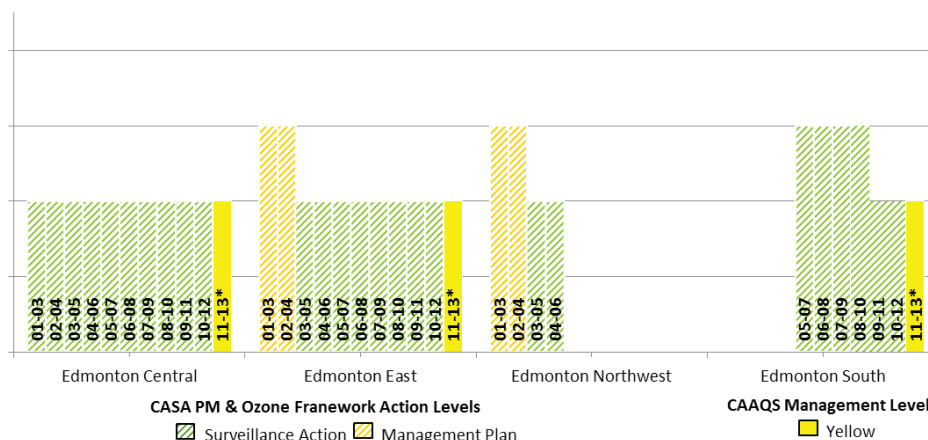


Figure 18:
8-hour metric of ozone (3-year-average of the annual 4th highest of the daily maximum 8-hour average concentrations) action/management level assignments at monitoring stations in the Fort Air Partnership airshed. All action/management level assignments were determined after the removal of trans-boundary flows and exceptional events. Action/management level assignments determined under the CASA Particulate Matter and Ozone Framework and the CAAQS may not be directly comparable due to differences in the removal of transboundary flows and exceptional events.

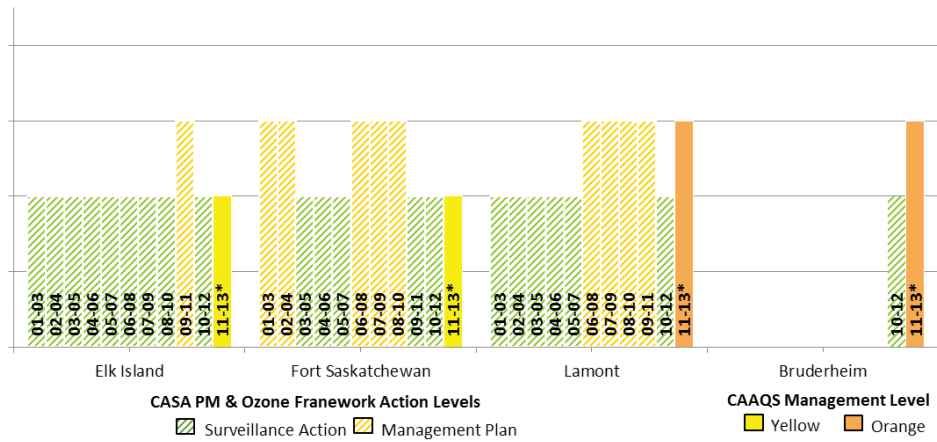
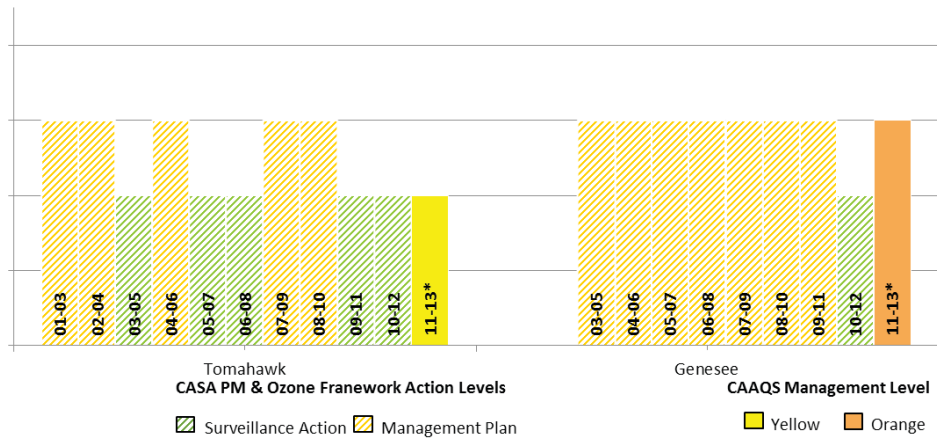


Figure 19:
8-hour metric of ozone (3-year-average of the annual 4th highest of the daily maximum 8-hour average concentrations) action/management level assignments at monitoring stations in the West Central Airshed Society airshed. All action/management level assignments were determined after the removal of trans-boundary flows and exceptional events. Action/management level assignments determined under the CASA Particulate Matter and Ozone Framework and the CAAQS may not be directly comparable due to differences in the removal of transboundary flows and exceptional events.





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